

WHAT IS CLAIMED IS:

1. An apparatus for measuring the thickness of a material using the focal length of a lensed fiber comprising:

a Piezo Electric Transducer 12 (PZT) which moves vertically against the material to be measured;

a lensed fiber 10 which is attached to said PZT for emitting a Gaussian beam; a laser 14 for emitting a beam source;

a beam shutter 16 for stopping the beam output returning; a 3dB optical fiber coupler for separating the beam strength from said lensed fiber 10 and laser 14 by 50:50;

a beam detector 20 for detecting reflected beam strength from the end of said lensed fiber;

a RC filter 22 for filtering said detected beam; a microprocessor for analyzing said detected beam strength;

an amplifier 26 for amplifying the strength of electric signals according to the control of said microprocessor 24;

a PZT driver 28 for driving PZT 12 according to the strength of electric signals amplified by said amplifier 26;

a X-Y axis scanner driver 30 for driving the X-Y axis scanner according to the control of said microprocessor 24;

5 a X axis scanner 32 for driving the X axis according to the driving of the X-Y axis scanner; and

a Y axis scanner 32 for driving the Y axis according to the driving of the X-Y axis scanner.

10 2. A method for measuring the thickness of a material using the focal length of a lensed fiber wherein said lensed fiber generates a form of Gaussian Beam and is attached to PZT 12 in order to detect the quantity of beam while the lensed fiber is moved vertically against the material to be measured.

15 3. The apparatus as claimed in Claim 1, wherein the thickness of said material is measured by using a lensed fiber 10 whose focal length is longer than the beam coherent length of the beam.

20 4. The apparatus as claimed in Claim 1, wherein the thickness of said material is measured by squaring

of the difference between the average values of interference patterns and the actual interference patterns.

5 5. The machine as in any one of Claims 2, 3 or 4, wherein instead of the lensed fiber 10, a normal lens is used for measuring the thickness of the material.

6. The apparatus as claimed in Claim 1, wherein the thickness of said material is measured by using the fact that the strength of the reflected beam from the surface of the material has two peak values.

7. The apparatus as claimed in Claim 1, wherein if said material has multiple layers then the thickness of each layer is measured from the peak value of the reflected beam for each corresponding layer.

20